



Distance Versus Near Visual Acuity in Amblyopes

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Purpose of Study: To compare distance and near visual acuities monocularly in the amblyopic eyes and also to note which type of refractive error is most commonly associated with amblyopia.

Materials and Methods: The study involved comparison of distance and near visual acuities in 70 persons aged between 7 years and 40 years, of both genders, with amblyopic eyes, by using structured proforma. Distance and near visual acuities of the patients were assessed. Snellen visual acuity chart for distance acuity measurement and N notation chart for measurement of near visual acuity.

Results: The mean visual acuity of amblyopic eye at distance and near was similar. Out of 42 patients 31 (44.29%) had good visual acuities both at distance and near ranging from 6/6-6/18 at distance and N.5-N.8 at near in their right eyes. In left eyes out of 46 patients 25 (35.71%) it shows good visual acuity both at distance and near ranging from N.5-N.8 at near and 6/6-6/18 at distance. The refractive error which was more associated with amblyopia is hypermetropia. P value for all study was less than 0.05.

Conclusion: The study has concluded that most of the amblyopic patients are associated with hypermetropia. There was no statistically significant difference between near and distances visual acuities in amblyopes. So it was concluded that amblyopia does not affect one type of vision (distance or near) only but both of them.

Key Words: Amblyopia, visual acuity, association of refractive errors with amblyopia



Introduction:

Amblyopia (lazy eye /sleepy eye) comes from Greek word means dullness of vision. The term Amblyopia refers to a unilateral or bilateral decrease of vision; it is due to underdeveloped functioning of optic nerve which results in the brain favoring one eye over the other eye.

Amblyopia is a form of reduced visual form sense which is not a consequence of any clinically provable abnormality of visual pathway and that is not treated by the removal of any disability which makes a dioptric obstruction in the foveal image formation.¹

The progressive disorder of spatial vision in which there is a lack of morphological defects and ocular disorders to which refractive correction may not be beneficial is termed as amblyopia.²

On clinical point of view Amblyopia is describe as a two line difference of best corrected visual acuity between the two eyes.³

Amblyopia is a term that is used to explain decreased visual functions in one or both eyes that cannot be completely corrected by refractive correction. It is associated with unusual visual experience like anisometropia or high refractive errors in early life. Many studies have revealed that amblyopia eye saccadic latency time is more.⁵

Lazy eye is a neurodevelopmental illness which if not detected and corrected early in childhood causes permanent decrease of vision and affects up to 2 % of inhabitants. If lazy eye is treated in children age of 4-5 years it is most beneficial than that of old ages because above this age the visual outcome is poor.⁵

The main cause of amblyopia is uncorrected refractive errors, during critical period of visual development in early childhood of age less than 8 years. Refractive errors do not improve significantly after this critical period and as a result the eye become amblyopic.⁶

Anisometropia if not corrected in children may causes amblyopia, especially in hyperopic eye. Anisometropia can cause amblyopia it may be due to active inhibition of fovea to prevail over the obstruction to superimpose a focused image in one eye and defocused image in the other eye. It was found that 50% of amblyopia is due to anisometropia.⁷

Amblyopia is due to unequal stimulation of the visual system in the critical period of visual development in childhood with age less than eight years. It may be unilateral or bilateral and factors affecting may be as following.

- Light deprivation
- Form deprivation
- Abnormal interaction.¹

Materials and Methods:

This was a Comparative Cross-sectional Study comprising a total of 70 patients below 40 years and above 7 years. 35 subjects had refractive error with amblyopia while 35 had Refractive errors without amblyopia. The visual acuity was checked with Snellen's chart and a note was made of the type of refractive error of the subject. The findings were compared for the most common refractive error in persons with amblyopia.

Results:

Fig. 1: Distance visual acuity of right eye

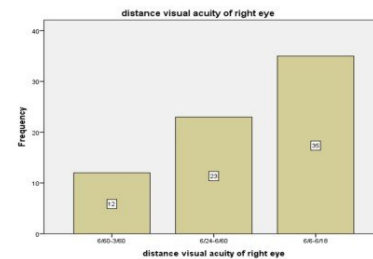


Fig. 1 shows the visual acuity of right eye in amblyopic patients. In right eye dense amblyopia is present 12 patients who is in the range of 6/60-3/60, while mild amblyopic eye in 23 patients, in the range of 6/24-6/60 and low amblyopia in 35 patients, in the range of 6/6-6/18. This may be because of the dominance of right eye.

Fig. 2: Distance visual acuity of left eye

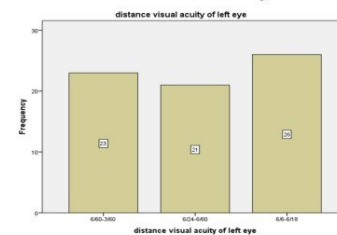


Fig. 2 shows the visual acuity of left eye in amblyopic patients. This shows 23 patients with denser amblyopia in the range of 6/60-3/60 as compared to right eye, mild amblyopia of 21 patients, in the range of 6/24-6/60 and low amblyopia of 26 amblyopic individuals, in the range of 6/6-6/18. This may be because of low dominance of left eye.

Fig. 3: Near visual acuity of right eye without glasses

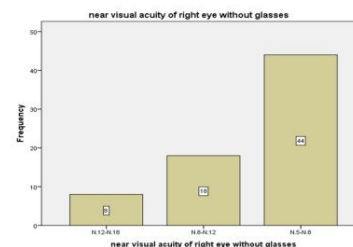


Fig. 3 shows near visual acuity of right eye in

amblyopic patients. It shows that out of seventy amblyopes only eight amblyopes were having near visual acuity ranging from N.12 to N.18. Eighteen were with near visual acuities ranging from N.8 to N.12 and forty four were with near visual acuities in the range of N.5 to N.8.

Fig. 4: Near visual acuity of left eye without glasses

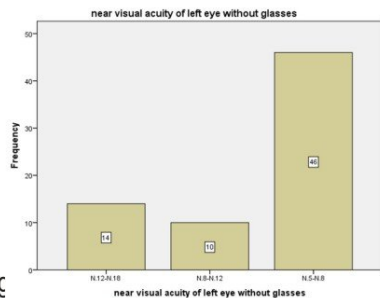
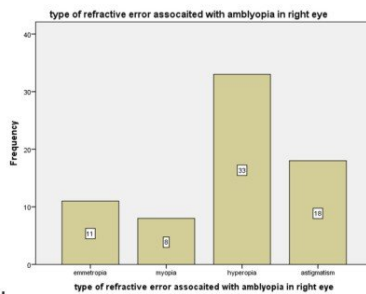


Fig. 4 shows near visual acuity in 14 amblyopes was in the range of N.12-N.18, in 10 amblyopes was ranging from N.8-N.12 and the near visual acuity of 46 amblyopic patients was from N.5-N.8.

Fig. 5: Type of refractive error associated with amblyopia in right eye



This figure shows type of refractive errors in the right eye which were associated with amblyopia. The number of Emmetropes was 11, myopia 8, hyperopia 33 and astigmatism 18. It shows that hypermetropes were more associated with amblyopia than other types of refractive errors.

Fig. 6: Type of refractive error associated with amblyopia in left eye

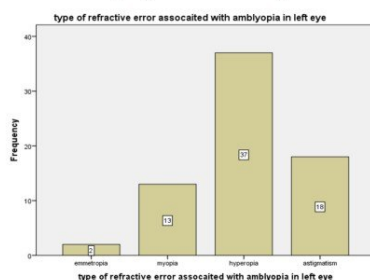


Fig. 6 shows type of refractive error associated with

amblyopia in the left eye of the patient. Two were emmetropes, 13 myopes, hyperopes 37 and astigmatic were 18. Most of the patients showed more hyperopia in their left eyes having more association with amblyopia.

Discussion:

Amblyopia is a common cause of preventable blindness in children. It is the decrease in visual acuity due to abnormal binocular interaction. Clinically it is identified as a difference of two or more lines of best corrected visual acuity on Snellen chart which may be less than 6/18. Amblyopia may be monocular or binocular. The aim of this study is to find the similarities or differences between distance and near visual acuities in amblyopes and also to assess the association of refractive errors with amblyopia. Uncorrected refractive errors are one of the main causes of amblyopia. The prevalence was 2.8% in a study done in china⁸.

Near visual acuity in amblyopes was concluded to be similar to that of distance visual acuity in a study done by Christoff et al. In their study mean visual acuity for distance was +0.45 or -0.11 log MAR and mean visual acuity for near was 0.45 +0.45 or -0.21 log MAR. Mean visual acuity of amblyopes at distance and near came out to be identical, except for small differences in individual eyes⁹.

The findings of this study are similar to the above study as it has concluded the similarity between near and distance visual acuities on average. Through this study it has been seen that out of 42 patients 31 (44.29%) have good visual acuities both at distance and near ranging from 6/6-6/18 at distance and N.5-N.8 at near in their right eyes. While in left eyes out of 46 patients 25 (35.71%) it shows good visual acuity both at distance and near ranging from N.5-N.8 at near and 6/6-6/18 at distance.

This study was done in a short period of time. During this duration I have seen many of amblyopic patients in whom the early treatment has given better results by doing good refraction and patching. Because our first option is to treat amblyopia by good refraction in case of esotropia. Patching in children below 10 years is more effective than above this because less chances of improvement. Many children visiting orthoptic clinic after patching technique showed visual acuity of amblyopic eye to 6/9 which is almost normal. There were many patients with dense amblyopia which is because of lack of awareness and careless treatment.

The study also found that amblyopia is more associated with hypermetropia, the type of refractive error in the right eye, out of 70 patients 33 were hyperopes out of which 6 were in the range of 6/60-3/60, 9 were having visual acuities ranging from 6/24-6/60 and 18 were having visual acuities in the range of



6/6-6/24. In the left eye amblyopia again associated with hypermetropia including 70 patients, 37 of which have hypermetropia out of which 15 were having visual acuities ranging from 6/60-3/60, 19 were having visual acuities in the range of 6/24-6/60 and 12 were having range of visual acuities 6/6-6/18. So we concluded that most common type of refractive error associated with amblyopia is the hypermetropia, which is almost 50% in amblyopia.

According to the results of the study amblyopia was found in high proportion in hypermetropes while it was also found in myopes and astigmatic patients. The more effective technique done to detect amblyopia is first find the refractive errors in child and correct them with careful examinations.

During my study I observed that patients managed with patching technique tend to have good results thereafter as compared to those without patching. Older patients like above 10 years of age do not show improvement in vision because their vision development period had already been completed. Therefore, children in primary schools should be regularly assessed for amblyopia so that it could be treated earlier. In this way we will be able to eradicate blindness from the society.

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